Supramolecular diversity and magnetic properties of novel heterometallic Cu(II)/Cr(III) complexes prepared from copper powder, Reineckes salt and ethylenediamine.

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Three novel heterometallic complexes $[Cu(en)_2Cr(NCS)_4(NH_3)_2][Cr(NCS)_4(NH_3)_2] \cdot 6dmf$ (**1**), $[Cu(en)_2Cr(NCS)_4(NH_3)_2](OAc)$ (**2**) and $[\{Cu(en)_2\}_3\{Cr(NCS)_4(NH_3)_2\}_2(NCS)_2](NCS)_2$ (**3**) have been synthesized in a one-pot reaction from copper powder, Reineckes salt, NH_4X [$X^- = OAc^-$ (**2**), NCS^- (**3**)] in a dmf (**1**) or CH_3CN (**2**, **3**) solution of ethylenediamine (en). X-ray studies showed that **1** and **2** consist of cationic polymeric chains, formed by and building blocks that bridged through thiocyanate anions. In both complexes, distinct hydrogen bonds are present and serve to increase the dimensionality of the compound from one to two (in **1**) or three (in **2**). The main structural feature of **3** is the pentanuclear Cu_3Cr_2 cation which is H-bonded with uncoordinated thiocyanate groups generating a 3D supramolecular assembly. The shortest Cu···Cr distances are 5.840(1) Å for **1**, 5.856(1) and 6.018(3) Å for **2** and 6.009(9) and 6.465(9) Å for **3**. Compounds **1** and **2** are essentially paramagnets whereas compound **3** shows a weak antiferromagnetic coupling. The magnetic properties are simulated and discussed in terms of the structural features.

Słowa kluczowe

Heterometallic complexes, Reineckes anion, Copper(II), H-bonds

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